

## ABSTRACT OF THE DISCLOSURE

Anterior ischemic optic neuropathy (~~AION~~) is ~~one~~  
~~of a family of~~ an ischemic diseases affecting the optic  
nerve. A blockage of vessels supplying the intra-retinal  
5 portion of the optic nerve causes results in loss of axon  
transport stasis, retinal ganglion cell, (~~RGC~~)—specific  
dysfunction, and RGC death. ~~AION~~ Research has been limited  
by the lack of an ~~appropriate, easily replicable, rapidly~~  
~~inducible,~~ low-cost models for this disease. ~~We have~~  
10 ~~developed such a model. Animals were handled and utilized~~  
~~in accordance with ARVO guidelines.~~ Using a custom  
~~designed fundus~~ contact lens, an intravenous injection of  
photosensitizing agent ~~was administered to anesthetized~~  
~~100g~~ male Sprague-Dawley rats. A laser ~~was used to~~  
15 ~~directly~~ activated dye within the small vessels perfusing  
the optic nerve. This treatment ~~was used to selectively~~  
spared the larger ~~caliber~~ vessels perfusing the inner  
retina. Electrophysiologically, a decrease in amplitude of  
the visual evoked potential is noted. ~~Gross, histologic,~~  
20 ~~molecular, and electrophysiological techniques are used to~~  
~~analyze changes induced by this method.~~ ~~The acutely~~  
~~treated rodent optic nerve grossly has the appearance of~~  
~~human AION, with pale edema.~~ ~~Electrophysiological, a~~  
~~decrease in amplitude of the visual evoked potential is~~  
25 ~~noted.~~ Histologically, alterations in axonal transport are  
seen. Reverse-transcriptase based Polymerase chain

later retinal gene expression changes in the treated animals. This new method accurately replicates many cellular and molecular level changes in a low-cost animal model. ~~may greatly accelerate our understanding of the~~  
5 ~~pathological long and short term processes involved in~~  
~~AION, and increase our ability to develop more effective~~  
~~treatments for this disease.~~